

REMARKS

In paragraphs 1, 2 and 3 of the Office Action claims 1-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (AAPA) in view of Chen et al (US 6,183,859), stating:

"Applicant's Admitted Prior Art (AAPA) shows in figure 2 a magnetic head 30 including a spin valve sensor 50 with a magnetic shield layer 34 being fabricated above a substrate base 42. Figure 3 shows a first electrical insulation layer first electrical insulation layer 44 being fabricated above the shield layer 34 and a spin valve sensor 50 structure being disposed above the first electrical insulation layer 44 layer. The spin valve sensor 50 structure of AAPA includes a seed layer 76/80/84 being fabricated above the first electrical insulation layer 44 layer. A PtMn layer is disposed above the seed layer 76/80/84 and at least one pinned magnetic layer and at least one free magnetic layer is disposed above the PtMn layer. The seed layer 76/80/84 includes an Al sublayer, an NiMnO sublayer, and an Ta sublayer.

The Ta seed sublayer of AAPA is fabricated to have a thickness of approximately 10 to 40 Angstroms. ppi AAPA shows in figure 3 that the spin valve sensor 50 layers include at least one pinned magnetic layer having a composition including CoFe and at least one spacer layer having a composition including Cu with at least one free magnetic layer having a composition including Co or CoFe.

AAPA discloses that the sublayer has an upper surface. As the claims are directed to a spin valve sensor, per se, the method limitation appearing in claim 7 has only been accorded weight to the extent that it affects the structure of the completed spin valve sensor. Note that "of patentability in 'product-by-process' claims is based on product itself, even though such claims are limited and defined by process ["etched"], and thus product in such claim is unpatentable if it is the same as, or obvious form, product of prior art, even if prior product was made by a different process", in re Thorpe, et al., 227 USPQ 964 (CAFC 1 95' Furthermore, note that a "claim, although reciting subject matter of claim in terms of how it is made ["etched"] is still product claim; it is patentability of product claimed and not recited process steps that must be established, in spite of fact that claim may recite only process limitations", in re Hirao and Sato, 190 USPQ 685 (CCPA 1976).

AAPA, however, is silent as to a sublayer of the seed layer being Si. AAPA is also silent as to the seed sublayer being fabricated to have a thickness of approximately 20 Angstroms and the PtMn layer having a thickness of approximately 120 Angstroms. Chen et al discloses in the paragraph bridging columns 3 and 4 a sublayer of a seed layer being either Ta or Si, which includes a crystalline form differing from a deposited Si seed layer.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to substitute the Ta layer of AAPA with a Si

layer as taught by Chen et al. The rationale is as follows: one of ordinary skill in the art at the time the invention was made would have been motivated to substitute a Ta layer with a Si layer, which is well within the purview of a skilled artisan and absent an unobvious result, because the two layers are art recognized equivalents.

It also would have been obvious to a person having ordinary skill in the art at the time the invention was made to fabricate the seed sublayer of AAPA to have a thickness of approximately 20 Angstroms and the PtMn layer of AAPA to have a thickness of approximately 120 Angstroms. The rationale is as follows: one of ordinary skill in the art at the time the invention was made would have been motivated to fabricate the seed sublayer to have a thickness of approximately 20 Angstroms (down from 35 Angstroms) and the PtMn layer to have a thickness of approximately 120 Angstroms (down from 150 Angstroms), which is well within the purview of a skilled artisan and absent an unobvious result, to reduce the size of the spin valve sensor.”

In response to Applicant’s prior amendment, it is further stated in the Final Office Action:

“Applicant’s arguments filed August 17, 2005 have been fully considered but they are not persuasive. Applicant asserts on page 13 in the third full paragraph the following:

“Chen 359 teaches nothing with regard to the characteristics of a PtMn antiferromagnetic layer; it does not even mention an antiferromagnetic layer, nor does it mention PtMn. Therefore, Chen teaches nothing with regard to the advantages that could be obtained by fabricating a PtMn antiferromagnetic layer upon an Si seed layer, as opposed to the prior art tantalum seed layer.

Chen is not relied upon for the PtMn layer. AAPA is shows the PtMn layer.

In the first full paragraph on page 14, asserts the following:

Applicant has amended claims 7, 8, 21 and 22 to describe the upper surface of the Si seed layer as a product limitation rather than a process limitation; specifically that the crystallographic surface of the Si seed layer surface differs from that of a deposited Si seed layer.

As stated supra, the Si layer of Chen, which Chen teaches to be an art recognized equivalent of the Ta layer of AAPA, encompasses a crystalline form of crystallographic surface as defined by The American Heritage Dictionary of the English Language, Fourth Edition. This Si differs from a nebulous undefined deposited Si seed layer.”

Applicant respectfully traverses the rejection and asserts that the claims recite patentable subject matter as is next discussed.

Applicant’s invention is quite specific. As recited in claim 1 it’s features include a spin valve sensor having a PtMn layer that is fabricated upon an Si seed layer.

In independent claim 8 it is further claimed that the upper surface of the Si seed layer has a crystallographic surface that differs from the upper crystallographic surface of a deposited Si seed layer.

The Applicant's admitted prior art (AAPA) teaches the fabrication of a PtMn layer upon a deposited Ta layer. Chen '359 teaches that when fabricating an aluminum barrier layer of a magnetic tunnel junction sensor that a deposited Ta seed layer or deposited Si seed layer are equivalent.

The pertinent part of the rejection states:

"The rationale is as follows: one of ordinary skill in the art at the time the invention was made would have been motivated to substitute a Ta layer with a Si layer, which is well within the purview of a skilled artisan and absent an unobvious result, because the two layers are art recognized equivalents."

Applicant respectfully traverses this rationale. Firstly, Chen teaches the substitution of an Si seed layer for a Ta seed layer within the context of fabricating an aluminum barrier layer where, specifically, the aluminum barrier layer is fabricated to include a portion of the seed layer material. Chen teaches nothing with regard to the fabrication of a PtMn layer nor the seed layer that might be used therewith.

Therefore, this obviousness rejection basically is nothing more than an assertion that it would be "obvious to try". That is, the rejection asserts that because some prior art teaching reveals that in some circumstance for an entirely different material for an entirely different purpose that various seed layer materials may be utilized, that for all other applications involving different materials and different structures (such as the present invention) that one skilled in the art would recognize that all such seed layer materials are recognized substitutes and one skilled in the art would be motivated to substitute one for the other.

Applicant submits that this rationale for this rejection is overbroad and unsupportable. Applicant urges that one skilled in the art knows that in fabricating different layers composed of different materials (such as a PtMn layer and an aluminum layer) that different seed layer materials are generally required due to differing atomic spacings and crystal structures of the different materials and different functions to be performed by the different materials. Specifically, that the substitution of an Si seed layer for a Ta seed layer in the context of fabricating an aluminum barrier layer (Chen '859) does not render it obvious to one skilled in the art that such a substitution of an Si seed layer for a Ta seed layer in the context of fabricating a

PtMn layer will be efficacious. Applicant submits that it is only through the improper use of hindsight that this rejection is made.

Now focusing on claim 8 and the further limitation that the upper surface of the Si seed layer has a crystallographic surface that differs from the upper crystallographic surface of a deposited Si seed layer. There is no teaching in the AAPA or Chen '859 with regard to this feature. Each of AAPA and Chen '859 teach a deposited seed layer, regardless of its composition (Ta or Si). Neither teaches or suggests any advantage that might be obtained through the use of a seed layer having a crystallographic surface that differs from a deposited seed layer. In the rejection it is stated that:

As stated supra, the Si layer of Chen, which Chen teaches to be an art recognized equivalent of the Ta layer of AAPA, encompasses a crystalline form of crystallographic surface as defined by The American Heritage Dictionary of the English Language, Fourth Edition. This Si differs from a nebulous undefined deposited Si seed layer."

Responsive hereto, Applicant traverses this reasoning. Specifically, many, many sources (such as for instance the dictionary citation) teach the existence of a crystalline form of crystallographic surface. However, Chen '859 does not teach the use of such a crystalline structure surface. Rather, Chen teaches a deposited seed layer, as is set forth in column 3, lines 61-63, stating:

"In a second technique, seed material is deposited on surface 12 of magnetic layer 11 by any convenient method." Emphasis added.

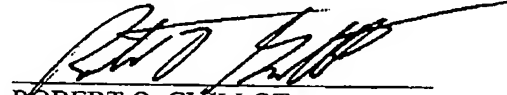
Applicant's Si surface limitations specifically exclude a deposited Si layer surface. In Applicant's specification, Table 1, in the column headed Fig. 5, the unexpected advantageous properties achieved when using an Si seed layer having a crystallographic surface structure that differs from a deposited Si surface (when a PtMn layer is fabricated thereon) is disclosed. Applicant therefore respectfully submits that independent claim 8 recites subject matter that is not obvious from the cited prior art.

With regard to dependent claims 2-7, 9-14, 16-21 and 23-28, Applicant additionally submits that these claims recite specific Si seed layer thicknesses and compositions and specific PtMn layer thicknesses that are neither taught by nor obvious from the cited prior art. Additionally, Applicant urges that the dependent claims are allowable in that they depend, either directly or indirectly, from allowable independent base claims.

With regard to the comment in the Office Action regarding inventorship, Applicant asserts that the inventors are properly identified.

Having responded to all of the paragraphs of the Office Action, and having amended the claims accordingly, Applicant respectfully submits that the Application is now in condition for allowance. Applicant therefore respectfully requests that a Notice of Allowance be forthcoming at the Examiner's earliest opportunity. Should the Examiner have any questions or comments with regard to this amendment, a telephonic conference at the number set forth below is respectfully requested.

Respectfully submitted,


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